

10/804,405

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Date: May 13, 2008 Time: _____
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Message:

Please see the attached correspondence concerning Application No. 10/804,405.
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Attorney Docket No.: 42P17834

Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
)	
Yan Liu et al.)	Examiner: Ingberg, Todd D.
)	
Application No.: 10/804,405)	Art Unit: 2198
)	
Filed: March 18, 2004)	Confirmation No.: 7372
)	
For: OPTIMIZED ORDERING OF)	
FIRMWARE MODULES)	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DRAFT RESPONSE UNDER 37 C.F.R. §1.111

Sir/Madam:

In response to the Examiner's telephone communication of May 9, 2008, the Examiner is respectfully solicited to enter the following amendments and consider the following remarks.

SPECIFICATION AMENDMENTS

Please replace the paragraph on page 20 line 7 with the following:

For the purposes of the specification, a machine-accessible medium includes any mechanism that provides (i.e., stores and/or transmits) information in a form readable or accessible by a machine (e.g., a computer, network device, personal digital assistant, manufacturing tool, any device with a set of one or more processors, etc.). For example, a machine-accessible medium includes, but is not limited to, recordable/non-recordable media (e.g., a read only memory (ROM), a random access memory (RAM), a magnetic disk storage media, an optical storage media, a flash memory device, etc.). In addition, a machine-accessible medium can include ~~propagated~~-signals such as electrical, optical, acoustical or other form of ~~propagated~~ signals (e.g., ~~carrier-waves~~, infrared signals, digital signals, etc.).

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) A method, comprising:

identifying in a pre-boot environment a plurality of module-to-module interfaces from a plurality of firmware modules, wherein a module-to-module interface allows a first firmware module of the plurality of firmware modules to invoke a second firmware module of the plurality of firmware modules;

identifying in the pre-boot environment a plurality of dependency expressions corresponding to the plurality of firmware modules, wherein each dependency expression of a firmware module describes the module-to-module interfaces needed for execution of the firmware module;

evaluating in the pre-boot environment the dependency expressions to determine an optimized pre-boot dispatch order of the firmware modules;

dispatching in the pre-boot environment the firmware modules in response to the determined pre-boot dispatch order; and

providing pre-boot services to the dispatched firmware modules wherein the pre-boot services comprise temporary management of random access memory in the pre-boot environment.

2. (Previously Presented) The method of claim 1, further comprising computing a directed acycle graph (DAG) based on the plurality of dependency expressions and the

plurality of module-to-module interfaces, the DAG to be used in sorting the plurality of firmware modules.

3. (Previously Presented)The method of claim 1 wherein the plurality of module-to-module interfaces have been provided by collecting metadata from each module-to-module interface of the plurality of module-to-module interfaces, the metadata describing the module-to-module interfaces produced by the firmware module.

4. (original)The method of claim 1, further comprising generating an error if a firmware module of the plurality of firmware modules includes a dependency expression that refers to a module-to-module interface that is not produced by the plurality of firmware modules.

5. (original)The method of claim 1 wherein the plurality of firmware modules comprise a plurality of Pre-EFI (Extensible Firmware Interface) Initialization Modules (PEIMs).

6. (original)The method of claim 5 wherein the plurality of module-to-module interfaces comprise a plurality of PEIM-to-PEIM Interfaces (PPIs).

7. (Previously Presented)The method of claim 1, further comprising selecting bootstrap processors from a plurality of processors in the computer system in the pre-boot environment, wherein selecting the bootstrap processors comprises waiting for a selected the processors to provide a status report of the selected process within a waiting time.

8. (Previously Presented) The method of claim 7, wherein the firmware modules comprise drivers for components of the computer system that are to be executed by a yet-to-be-booted operating system.

9. (Previously Presented) The method of claim 7 wherein the firmware modules operate in accordance with an Extensible Firmware Interface (EFI) specification.

10. (Previously Presented) The method of claim 7, further comprising using an update utility to update the firmware modules.

11. (Currently amended) An article of manufacture comprising:

a machine-accessible medium including a plurality of instructions which when executed perform operations in a computer system comprising:

entering a pre-boot environment;

initializing in the pre-boot environment a Pre-EFI Initialization (PEI) foundation that includes a PEI Services Table that is accessible by PEI modules (PEIM) in the computer system, wherein each PEIM comprises a dependency expression, and wherein the PEI foundation comprises a PEIM dispatcher;

using the PEI foundation to provide PEIM services to the PEIMs; and

using the PEIM dispatcher to dispatch the PEIMs in accordance with the dependency expression of each PEIM.

12. (Previously Presented)The article of manufacture of claim 11 wherein the dependency expressions have been generated using a directed acycle graph (DAG) based on the dependency expressions and metadata.

13. (Previously Presented)The article of manufacture of claim 11 wherein execution of the plurality of instructions further perform operations of drivers for components of the computer system that are to be executed by a yet-to-be-booted operating system.

14. (Previously Presented)The article of manufacture of claim 11 wherein execution of the plurality of instructions further perform operations comprising generating an error signal if the module-to-module interface of a dependency expression is not described in metadata associated with each PEIM.

15. (Previously Presented)The article of manufacture of claim 11 wherein execution of the plurality of instructions further perform operations comprising removing metadata from each PEIM.

16. (Previously Presented)The article of manufacture of claim 11 wherein the PEIMs operate in accordance with an Extensible Firmware Interface (EFI) specification.

17. (Previously Presented)The article of manufacture of claim 11 wherein each PEIM includes PEIM-to-PEIM Interfaces (PPIs).

18. (Previously Presented) A computer system, comprising:

a processor; and

a magnetic storage device operatively coupled to the processor, the magnetic storage device including instructions which when executed by the processor perform operations comprising:

collecting in a pre-boot environment a dependency expression from each of a plurality of firmware modules;

collecting metadata from each of the plurality of firmware modules, the metadata describing module-to-module interfaces produced by a firmware module of the plurality of firmware modules;

sorting the plurality of firmware modules into an optimized order based on the dependency expressions and the metadata; and

dispatching in the pre-boot environment the plurality of firmware modules in the optimized order.

19. (Previously Presented) The computer system of claim 18, further comprising a second processor for dispatching the plurality of modules in the optimized order.

20. (original) The computer system of claim 18, further comprising a network interface operatively coupled to the processor to receive at least one firmware module of the plurality of firmware modules.

21. (original)The computer system of claim 18 wherein the plurality of firmware modules includes a plurality of Pre-BFI (Extensible Firmware Interface) Initialization Modules (PEIMs) and the module-to-module interfaces include PEIM-to-PEIM Interfaces (PPIs).

22. (Presently amended) A system, comprising:

data stored in a tangible medium which encodes a set of firmware modules in a predetermined order, the predetermined order defined according to:

a dependency expression associated with each firmware module
of the set of firmware modules; and

metadata associated with each firmware module, the metadata
describing module-to-module interfaces produced by each firmware
module; and

code stored in a tangible medium which in a pre-boot environment executes the set of firmware modules according to the predetermined order.

23. (original)The system of claim 22 wherein the data which encodes the set of firmware modules includes a firmware volume.

24. (original)The system of claim 22 wherein the code is executed during a pre-boot phase of a computer system.

25. (original) The system of claim 22 wherein the code which executes the set of firmware modules includes a PEI foundation module.

26. (original) The system of claim 22 wherein the set of firmware modules includes a plurality of Pre-EFI (Extensible Firmware Interface) Initialization Modules (PEIMs) and the module-to-module interfaces include PEIM-to-PEIM Interfaces (PPIs).

27. (Previously Presented) The system of claim 22 wherein the data and the code comply with an Extensible Firmware Interface (EFI) specification.

REMARKS

The Examiner is thanked for an indication that the pending claims are allowable over the previously cited art. The Examiner is also thanked for the Examiner's telephone communication of May 9, 2008 in which sections 101 and 112 issues were discussed. No agreement was reached. Applicants propose the amendments given above and submit the changes overcome potential sections 101 and 112 rejections.

The dependent claims are novel and nonobvious over the prior art of record for at least the same reasons as discussed above in connection with their respective independent claims, in addition to adding further limitations of their own. Accordingly, Applicants earnestly solicit agreement that the claims are allowable.

CONCLUSION

In view of the foregoing proposed amendments and remarks, it is believed that the potential rejections would be overcome and all claims remaining in the application would be in condition for allowance. Accordingly, favorable consideration and a Notice of Allowance are earnestly solicited. The Examiner is invited to telephone the undersigned representative at (206) 292-8600 if the Examiner believes that an interview might be useful for any reason.

CHARGE DEPOSIT ACCOUNT

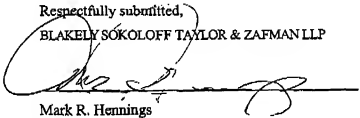
It is not believed that extensions of time are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a). Any fees required therefore are hereby authorized to be charged to Deposit Account No. 02-2666. Please credit any overpayment to the same deposit account.

Respectfully submitted,

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

Date:

May 13, 2008


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